

BILLING CODE 3810-FF

DEPARTMENT OF DEFENSE

Department of the Navy

Record of Decision and General Conformity Determination for  
Realignment of E-2 Squadrons from Marine Corps Air Station  
(MCAS) Miramar, California

AGENCY: Department of the Navy, DOD

ACTION: Notice of Record of Decision

SUMMARY: The Department of the Navy, after carefully  
weighing the operational, environmental, and cost  
implications of relocating E-2 aircraft from MCAS Miramar to  
other Naval installations, announces its decision to realign  
four E-2 squadrons to Naval Air Weapons Station (NAWS) Point  
Mugu, California.

FOR FURTHER INFORMATION CONTACT: Ms. Kelly K. Knight,  
Southwest Division, Naval Facilities Engineering Command  
(Code 553.KK), 1220 Pacific Highway, San Diego, CA 92132,  
telephone (619) 532-2456.

SUPPLEMENTARY INFORMATION: The text of the entire Record of  
Decision is provided as follows:

The Department of the Navy (DON), pursuant to the  
Defense Base Closure and Realignment Act of 1990 (10 USC  
2687), Section 102 (2) (C) of the National Environmental

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Approved for public release;  
Distribution Unlimited

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Policy Act (NEPA) of 1969 (42 USC 4331 et seq.), and the regulations of the Council on Environmental Quality that implement NEPA procedures (40 CFR Parts 1500-1508), hereby announces its decision to realign 16 E-2 aircraft, relocate 988 military and civilian personnel with their families, expand and construct facilities to support aircraft and personnel, and provide associated training functions at Naval Air Weapons Station (NAWS) Point Mugu, California. The realignment to NAWS Point Mugu was identified as the Preferred Alternative in the Final Environmental Impact Statement (FEIS).

To support the additional personnel and operation and maintenance of the E-2 aircraft, eight construction projects, primarily consisting of modification or expansion of existing facilities, are required at NAWS Point Mugu.

Realignment of the E-2 squadrons will increase aircraft operations at NAWS Point Mugu. However, as these E-2 squadrons will continue to use the E-2 training ranges, including the Southern California Operations Area, there will be no increase in aircraft operations on the ranges.

Pursuant to Section 176(c) of the Clean Air Act (42 U.S.C. 7476(c)), the DON has determined that the realignment of the E-2 aircraft to NAWS Point Mugu conforms to California's State Implementation Plan for Ventura County. There were no comments on the draft conformity determination

published as Appendix D to the FEIS. The final conformity determination is being distributed concurrent with the ROD.

Realignment of the E-2 aircraft and operational functions will begin in July 1998 and should be completed in January 1999.

BACKGROUND: The 1993 Defense Base Closure and Realignment Commission (BRAC) recommended the realignment of MCAS El Toro and MCAS Tustin to NAS Miramar. The Commission also recommended that the squadrons and related activities at NAS Miramar would move to other naval air stations, primarily NAS Lemoore and NAS Fallon in order to make room for the relocation of MCAS El Toro squadrons.

In 1995, the BRAC Commission revised the 1993 BRAC Commission recommendations as follows: "Change the receiving sites for squadrons and related activities at NAS Miramar specified by the 1993 Commission (BRAC Commission 1993) from NAS Lemoore and NAS Fallon to other naval air stations, primarily NAS Oceana, Virginia, NAS North Island, California, and NAS Fallon, Nevada."

As the 1995 BRAC Commission did not recommend realignment of NAS Miramar aircraft to a specific base, the DON conducted a multi-stage screening process to identify reasonable and feasible alternatives for realignment of Pacific Fleet E-2 aircraft to a west coast Naval air

station. Other Navy aircraft stationed at NAS Miramar have already been realigned under separate NEPA actions.

PROCESS: A Notice of Intent was published in the *Federal Register* on May 1, 1996, announcing that the DON would prepare an Environmental Impact Statement (EIS) which would analyze the environmental effects of the E-2 realignment and associated facilities construction.

The DON published a Notice of Availability of the Draft EIS (DEIS) in the *Federal Register* and local newspapers on November 21, 1997. Three public hearings were held in the cities of El Centro, Oxnard, and Lemoore, CA, between December 8 and December 10, 1997, to solicit comments on the DEIS. A total of 30 individuals, agencies, and organizations submitted written comments on the DEIS. The FEIS addressed all oral and written comments.

The DON published a Notice of Availability of the FEIS and a draft Final CAA Conformity Determination in the *Federal Register* and local newspapers on April 17, 1998. The DON received 13 comment letters during the 30-day public review period. Substantive comments are addressed later in this ROD.

ALTERNATIVES CONSIDERED: The DON conducted a screening process, based upon criteria set out in the DEIS, to identify a reasonable range of alternatives that would satisfy the Navy's purpose and need. Based upon that

screening process, the DON analyzed the environmental impacts of the realignment and associated construction at NAWS Point Mugu, NAS Lemoore, and NAF El Centro.

Although initially identified as a potential realignment location, NAS North Island was eliminated from further consideration in recognition of Clean Air Act requirements associated with the Marine Corps realignment to MCAS Miramar.

The DON evaluated operational, logistical, and personnel requirements, environmental impacts and costs at each of the alternative locations. Based upon this comparative analysis, the DON identified NAWS Point Mugu as the preferred alternative.

The environmentally preferred alternative is the realignment of E-2 assets and personnel to NAS Lemoore because all impacts, other than those to schools, would be less than significant. Impacts to schools would be significant but mitigable if the school system successfully competed for federal impact aid payments.

ENVIRONMENTAL IMPACTS: The DON analyzed the potential impacts of the proposed action at NAWS Point Mugu (Preferred Alternative), NAS Lemoore, and NAF El Centro for effects on biological resources, hydrology/surface water quality, land use and airspace, socioeconomics, traffic and circulation, air quality, noise, aesthetics and visual resources,

utilities and services, cultural resources, public health and safety, and hazardous materials and wastes. The DON also considered whether the proposed action would be consistent with federal policies addressing environmental justice and environmental health risks to children.

This Record of Decision focuses on the significant impacts that will result from realignment of the E-2 aircraft to NAWS Point Mugu. The Preferred Alternative creates the potential for significant impacts on air quality, schools, and cultural resources at NAWS Point Mugu. Impacts on all other resources or functions analyzed in the FEIS were less than significant.

Air Quality - Emission sources under DON control will result in incremental emission increases that exceed the 25-ton-per-year de minimis threshold for ozone precursors (reactive organic compounds and nitrogen oxides) in Ventura County. The DON completed a conformity determination under Section 176(c) of the Clean Air Act and EPA's implementing regulations demonstrating that the projected increases in emissions of ozone precursors conforms with the State Implementation Plan (SIP) for Ventura County. Significant reductions have occurred in activity levels at NAWS Point Mugu since 1990 that are not reflected in the emission forecasts used in the 1994 ozone SIP for Ventura County. Thus, actual emission reductions at NAWS Point Mugu between

1990 and 1996 can be considered surplus emission reductions that have not already been used in the SIP for demonstrating attainment of the federal ozone standard. Since actual post-1990 emission reductions at NAWS Point Mugu exceed the actual emissions associated with the E-2 realignment action, emissions at NAWS Point Mugu will remain within the emission budgets contained in the 1994 ozone SIP for Ventura County. Additionally, growth allowances included in the regional air quality plan accommodate most, if not all, of the remaining emission increases. As part of this realignment decision, I approve the CAA Conformity Determination included in Appendix D of the FEIS.

Schools - Approximately 116 school children will be added to Ventura County schools in 1998-99 with the realignment of the E-2 squadrons to NAWS Point Mugu. Another 37 school children from support activities will be added to Ventura County schools in 1999-2000. All affected schools in Ventura County are operating over design and expansion capacity, therefore even this small increase in student population will exacerbate the existing adverse situation.

Cultural Resources - Prehistoric subsurface deposits which are potentially eligible for the National Register of Historic Preservation may be disturbed or destroyed during construction activities at NAWS Point Mugu.

## MITIGATION:

Schools - School districts may be eligible for federal funding which aids local school districts in the education of military children. Schools must apply for impact aid, and funds are paid directly by the Department of Education. The DON will assist, to the extent practicable, affected schools in their pursuit for federal impact aid.

Implementation of this mitigation may reduce the level of impact to one that is less than significant. However, mitigation may not fully compensate school districts for the cost of education.

Cultural Resources - Any contract, lease, or permit for construction at NAWS Point Mugu in conjunction with the implementation of the proposed action will include a requirement to halt work in the event of a discovery of archaeological materials. In such an event, the Contracting Officer will be notified immediately, and the NAWS Point Mugu archaeologist will document and evaluate the resource before work in the discovery area continues. Implementation of this mitigation measure will reduce the impact to a less than significant level.

## RESPONSE TO COMMENTS RECEIVED REGARDING THE FINAL

ENVIRONMENTAL IMPACT STATEMENT: The DON received comments on the FEIS from two federal agencies, two state agencies,



six local agencies, two citizen groups and one individual. Substantive comments are addressed below.

General - The Environmental Protection Agency requested more details on the baseline conditions at the Naval activities. The FEIS provided sufficient information to allow the decision maker and the public to identify the impacts of the proposed action.

Traffic/Circulation - One commentor stated the DON must pay a local Traffic Mitigation Fee for cumulative traffic impacts within Ventura County. The DON has no legal authority to pay this fee.

Noise - One commentor requested that DON conduct noise monitoring in adjacent communities. The noise modeling analyses presented in the FEIS are based on standard procedures widely used for commercial and military airfields. These procedures have been validated and are sufficient to predict the resultant noise levels in the NAWS Point Mugu vicinity from the additional aircraft operations.

Utilities and Services - One commentor expressed concern that the potential impacts to schools would be completely mitigated by federal payments to the school districts. The U.S. Department of Education (DOE) is the federal agency responsible for providing funds to school districts who educate large numbers of military children.

It is reasonable to expect that DOE will provide a portion of the cost for the military children's education. The precise dollar amount of the impacts cannot be calculated until the students are actually enrolled in the schools and the school district files an official application to DOE for receipt of impact aid funds.

Public Health and Safety - One commentor expressed concern that during Santa Ana wind conditions, the accident potential over the cities of Oxnard, Camarillo, and Port Hueneme would increase. The Air Installation Compatibility Use Zone Program included Santa Ana conditions in the calculations for the Accident Potential Zones ("APZs") shown in the FEIS. The APZs identified for Runway 03/21 mainly encompass agricultural land with the exception of the Naval Air Mobile Home Park.

Hazardous Material and Wastes - One commentor expressed concerns regarding the proportional increased risk of fuel spills from E-2 aircraft fuel handling. Spill prevention is an inherent part of NAWS Point Mugu fueling operations. All personnel who handle hazardous materials and wastes participate in a quarterly training update and are provided specific spill response guidance for their work areas.


CONCLUSIONS: In deciding where to realign E-2 aircraft from MCAS Miramar, I considered the following: the 1995 BRAC Commission recommendations; E-2 operational requirements;

costs associated with construction of facilities, operation and maintenance of aircraft, and training of personnel; environmental impacts; and the comments received during the DEIS and FEIS review periods.

After carefully weighing all of these factors, I have decided, on behalf of the Department of the Navy, to direct realignment of four Pacific Fleet E-2 squadrons to NAWS Point Mugu. Environmental impacts are slightly more than the NAS Lemoore and NAF El Centro alternatives; however, the NAWS Point Mugu alternative is operationally preferred because of close proximity to operating areas, is the least expensive alternative and it fully uses excess capacity at NAWS Point Mugu.

Implementation of the NAWS Point Mugu alternative will result in significant but manageable impacts to air quality and schools. Potentially significant adverse impacts to cultural resources will be mitigated to less than significant levels. The DON will implement the mitigation measures identified in this Record of Decision.

6/2/98  
Date

  
Duncan Holaday  
Deputy Assistant Secretary of  
the Navy (Installations and  
Facilities)

## **Final Clean Air Act Conformity Determination, Realignment of E-2 Squadrons from NAS Miramar To NAWS Point Mugu**

### **Applicability Analysis**

NAWS Point Mugu is located in Ventura County, California. Most of Ventura County (including NAWS Point Mugu) is designated a severe ozone nonattainment area. As indicated subsequently in Table 1, direct and indirect emissions of nitrogen oxides associated with the E-2 realignment exceed the de minimis threshold of 25 tons per year for ozone precursors. Consequently, Clean Air Act conformity determination requirements apply to the E-2 realignment action.

Some emission sources associated with the E-2 realignment action are exempt from consideration under the general conformity rule. Exempt emission sources include stationary sources that require permits from the Ventura County Air Pollution Control District (VCAPCD) and emission sources that are not under Navy control.

Because NAWS Point Mugu already has most facilities required to support the E-2 realignment, relatively few new facilities will be constructed. In some cases, facilities that currently have permits from the VCAPCD may require modifications. Existing engine test stands and existing aircraft maintenance facilities are the facilities most likely to require amendments to existing permits. NAWS Point Mugu Environmental Division staff have identified only one existing permit (for abrasive blasting, cleaning, and coating operations) that may require modification to accommodate the E-2 realignment action. Facilities covered by existing, amended, or new VCAPCD permits are exempt from consideration in a conformity determination.

Portable equipment associated with aircraft maintenance and flight operation activities is potentially subject to VCAPCD permit requirements. For most of this equipment, however, the Navy has the option of state registration (under Health and Safety Code sections 41750-41755) instead of having it permitted as a stationary source. State-registered portable equipment is not subject to new source review requirements, and thus must be considered in conformity analyses. For purposes of this conformity determination, all such equipment has been treated as permit-exempt portable or mobile source equipment, and included in the conformity analysis.

Vehicle travel associated with added military and civilian personnel has been separated into base-related travel (work-related trips) and other household travel (shopping and other nonwork trips). Emissions associated with base-related travel are included in the conformity analysis.

Emissions associated with increased use of government-owned vehicles are also included in the conformity analysis.

Emissions associated with shopping and other household travel (including work trips by spouses employed elsewhere) are not under Navy control, and thus are excluded from the conformity analysis. Additionally, emissions associated with off-base housing units (space heating, water heating, etc.) are not under Navy control, and are excluded from the conformity analysis.

#### **Summary of Added Emissions**

Conformity-related emission estimates for the E-2 realignment action are summarized in Table 1. The maximum annual conformity-related emissions will be 12.19 tons per year of reactive organic compounds and 31.59 tons per year of nitrogen oxides. These emission quantities will decline slightly after 1999 because construction activities will be complete and emissions from motor vehicles will continue to decline slightly each year. For simplicity, this conformity analysis assumes that conformity-related emissions from the E-2 realignment action remain constant after the year 1999.

#### **Post-1990 Emission Reductions at NAWS Point Mugu**

The Ventura County ozone SIP forecasts continuing growth in activity indexes for most emission source categories. Emission reductions presented in the SIP emission forecasts are achieved primarily through continuing or new emission control programs, rather than by forecasting reductions in underlying source activity levels.

The government aircraft category included in the Ventura County ozone SIP is expressly identified as flight operations based at NAWS Point Mugu (Ventura County Air Pollution Control District 1994c). Other stationary, mobile, and area emission sources associated with NAWS Point Mugu are incorporated into the SIP emission forecasts as inherent components of county-wide emission categories such as industrial, commercial, and residential fuel combustion; degreasing operations; surface coating operations; on-road motor vehicle travel; entrained dust from paved roadways; and small utility engine equipment operations.

Table 2 summarizes some of the county-wide growth factors used in the Ventura County ozone SIP to forecast emission changes for various stationary, mobile, and area sources. The growth factors included in Table 2 are those most relevant to emission sources at NAWS Point Mugu. The no growth and military aircraft indexes were projected to remain constant, but all other indexes anticipate continued growth. While the county-wide growth factors do not distinguish between growth of existing emission sources and establishment of new emission sources, they

also provide no indication that emission reductions were anticipated for NAWS Point Mugu in the 1994 Ventura County ozone SIP.

In reality, there were significant reductions in aircraft activity at NAWS Point Mugu between 1990 and 1996. Personnel reductions and reduced activity at various stationary and area emission sources occurred concurrently with the reductions in aircraft activity. The reductions in aircraft and personnel have resulted in emission reductions from a wide range of mobile and stationary sources at NAWS Point Mugu. Table 3 summarizes the identifiable emission changes that occurred at NAWS Point Mugu between 1990 and 1996. As can be seen from Table 3, almost all emission source categories at NAWS Point Mugu show reductions in emissions between 1990 and 1996.

As indicated in Table 3, the overall change in conformity-related emissions at NAWS Point Mugu between 1990 and 1996 amounts to a reduction of 32.13 tons per year in reactive organic compound emissions and a reduction of 39.48 tons per year in nitrogen oxide emissions. These post-1990 emission reductions at NAWS Point Mugu exceed the conformity-related emission increases (12.19 tons per year for reactive organic compounds and 31.59 tons per year of nitrogen oxides) that will be generated by the E-2 realignment action. By themselves, the emission reductions for government aircraft (28.28 tons per year of reactive organic compounds and 36.21 tons per year of nitrogen oxides) exceed all conformity-related emission increases associated with the E-2 action.

The following discussion provides additional details concerning emission estimates presented in Table 3.

*Aircraft Operations.* The 1994 ozone SIP for Ventura County uses 1990 as a base year. Aircraft flight operations for NAWS Point Mugu are discretely identified in the ozone SIP. Most flight operations are categorized as government aircraft. A few NAWS Point Mugu flight operations are identified as general aviation aircraft flights between NAWS Point Mugu and San Nicolas Island. Table 4 summarizes the emission estimates for NAWS Point Mugu aircraft operations as presented in the 1994 ozone SIP.

Emission forecasts in the ozone SIP assume a continuation of 1990 conditions for government aircraft operations based in Ventura County. In reality, the number of aircraft and personnel assigned to NAWS Point Mugu have been reduced since 1990. NAWS Point Mugu Environmental Division staff have identified 67 aircraft that no longer operate from NAWS Point Mugu (Table 5). These aircraft accounted for over one-half of all flight operations at NAWS Point Mugu during 1990.

Aircraft additions and changes in flight activity for remaining aircraft have introduced other changes in overall aircraft operations at NAWS Point Mugu. Table 6 summarizes aircraft flight activity and emission estimates developed by NAWS Point Mugu staff for 1996 conditions. The emission estimates presented in Table 6 were developed in a manner consistent with procedures and data sources used in the 1994 ozone SIP. Aircraft flight operation changes at NAWS Point Mugu between 1990 and 1996 account for emission reductions of 28.28 tons per year for reactive organic compounds and 36.21 tons per year for nitrogen oxides.

*Personal Vehicle Work Trips.* Section 3.4.1 of the EIS text indicates that the existing workforce at NAWS Point Mugu (military, civilian, and contractor personnel) is 8,167. Workforce reductions at NAWS Point Mugu between 1990 and 1996 amounted to 720 positions (Section 3.4.1 of the EIS text). Thus, the 1990 workforce for NAWS Point Mugu is estimated to have been 8,887. The 1999 emission estimates of E-2 personnel (96 positions) were used to extrapolate personal vehicle work trip emissions for the 1990 and 1996 NAWS Point Mugu workforce levels. The use of 1999 calendar year vehicle emission factors in this analysis procedure avoids the confounding effects of vehicle model year turnover and resulting changes in per-vehicle emission factors. Consequently, the 1990 - 1996 change in personal vehicle work trip emissions shown on Table 3 reflects the change in workforce levels, not the effect of state vehicle emission control programs.

*Government Vehicle Use.* Table 7 summarizes data from NAWS Point Mugu government vehicle odometer records for 1990 to 1997. The number of government vehicles at NAWS Point Mugu increased slowly between 1992 and 1997, but overall vehicle use fluctuated with little overall trend until 1996. Overall vehicle use for 1996 and 1997 was lower than average usage during the 1990-1995 period. Changes in government vehicle use appears to be tied to changing operational conditions at the base rather than to changing workforce levels. Table 8 presents the estimated change in NAWS Point Mugu government vehicle emissions between 1990 and 1996, using 1999 calendar year emission rates. The use of 1999 calendar year vehicle emission factors in this analysis procedure avoids the confounding effects of vehicle model year turnover and resulting changes in per-vehicle emission factors. Consequently, the 1990 - 1996 change in government vehicle emissions shown on Table 3 reflects the change in vehicle use, not the effect of state vehicle emission control programs.

The government vehicle emissions analysis presented in Table 7 does not account for vehicle fuel conversions that occurred between 1993 and 1996. During that time, 15 of 33 sedans and 63 of 307 light and medium duty trucks were converted from gasoline to compressed natural gas (CNG) or

dual fuel vehicles. Thus, the government vehicle emission reductions presented in Table 3 are somewhat underestimated.

*Other Emission Sources.* NAWS Point Mugu Environmental Division staff analyses (U.S. Navy 1997d) provided emission estimates for the source categories not discussed above. Most emission estimates are based on operational logs or fuel use records, and reflect data provided in annual reports to the Ventura County Air Pollution Control District.

#### **Statement of Conformity**

Post-1990 activity reductions at NAWS Point Mugu are not reflected in the emission forecasts used in the 1994 ozone SIP for Ventura County. Thus, actual emission reductions at NAWS Point Mugu between 1990 and 1996 can be considered surplus emission reductions that have not already been used in the SIP for demonstrating attainment of the federal ozone standard. Since actual post-1990 emission reductions at NAWS Point Mugu exceed the additional emissions associated with the E-2 realignment action, emissions at NAWS Point Mugu will remain within the emission budgets contained in the 1994 ozone SIP for Ventura County. Consequently, the E-2 realignment action for NAWS Point Mugu conforms to the applicable SIP pursuant to 40 CFR 51.858(a)(5)(i)(A). The Ventura County Air Pollution Control District issued a letter on April 28, 1998 in which they concurred with this evaluation.

NAWS Point Mugu will follow VCAPCD procedures to ensure that new, relocated, or modified facilities and equipment meet applicable VCAPCD rules and regulations (including all SIP requirements) prior to facility construction or installation.



TABLE 1. ANNUAL CONFORMITY EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAWA POINT MUGU ALTERNATIVE

YEAR	EMISSIONS COMPONENT	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
		REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1998	Construction Activity	0.26	3.56	1.88	0.35	1.44
	E-2 Operations	1.51	7.37	2.24	0.31	1.85
	E-2 Engine Run-Ups	0.39	1.08	0.56	0.05	0.31
	Aircraft Fuel Transfers	0.05	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	0.56	0.93	10.63	0.06	0.07
	On-Base Natural Gas Use	0.00	0.02	0.02	0.00	0.00
	Personal Vehicle Work Trips	1.49	1.06	14.79	0.03	2.84
	Added Government Vehicle Use	0.06	0.07	0.31	0.00	0.10
	1998 CAA Conformity Total	4.32	14.09	30.44	0.79	6.62
1999	Construction Activity	0.00	0.00	0.00	0.00	0.00
	E-2 Operations	4.53	22.10	6.73	0.93	5.55
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.69	2.79	31.89	0.18	0.22
	On-Base Natural Gas Use	0.00	0.07	0.05	0.00	0.01
	Personal Vehicle Work Trips	4.46	3.18	44.38	0.08	8.51
	Added Government Vehicle Use	0.19	0.22	0.93	0.00	0.30
	1999 CAA Conformity Total	12.19	31.59	85.67	1.33	15.53
2000+	E-2 Operations	4.53	22.10	6.73	0.93	5.55
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.69	2.79	31.89	0.18	0.22
	On-Base Natural Gas Use	0.00	0.07	0.05	0.00	0.01
	Personal Vehicle Work Trips	4.46	3.18	44.38	0.08	8.51
	Added Government Vehicle Use	0.19	0.22	0.93	0.00	0.30
	2000+ CAA Conformity Total	12.19	31.59	85.67	1.33	15.53
	Maximum CAA Conformity Analysis Emissions	12.19	31.59	85.67	1.33	15.53
	De Minimis Threshold	25.00	25.00	na	na	na
	Above De Minimis Level?	NO	YES	NO	NO	NO
	On-base Emission Reductions Not Included in SIP Forecasts	-32.13	-39.48	-126.84	-20.16	-34.00
	Conformity Emissions Change	-19.95	-7.89	-41.17	-18.83	-18.47
	Conformity Offset Requirements	none	none	none	none	none

TABLE 1. ANNUAL CONFORMITY EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAWS POINT MUGU ALTERNATIVE

Notes: Construction emission estimates assume 4.2 acres disturbed and 3,000 hours of heavy equipment operation in 1998; no construction projects would be initiated in 1999. Except for construction activity, 1998 emissions are assumed to be one-third of 1999 emissions, to reflect staggered squadron arrivals between July and December. E-2 aircraft emissions for 1999 and later years are based on 1,009 sorties per year with 20,768 total flight operations per year. In-frame engine run-up emission estimates are based on 51.6 30-minute engine tests plus 13 20-minute engine tests per year per aircraft (826 30-minute tests and 208 20-minute tests). Aircraft fuel transfer emissions are based on 4.1 million gallons of JP-5 or JP-8 fuel used per year, with two splash-loading fuel transfers; 3 months of fuel transfers at 50 degrees F, 9 months of transfers at 60 degrees F. Aircraft support equipment includes tow tractors, hydraulic test stands, and standby equipment items (such as generators, compressors, floodlight sets, portable air conditioning units, and aircraft engine air start units). Aircraft support equipment emission estimates are based on 2,600 hours per year of tow tractor use, 585 hours per year of hydraulic test stand use, and 144 hours per year of standby equipment use. On-base natural gas use emissions are based on 1.72 million cubic feet per year of natural gas use for space heating and water heating in added office, industrial, and personnel support buildings (10 BTU/hour/square foot heating energy demand). Personal vehicle work trip emissions based on 240 work days per year. Emissions from added government vehicle use based on 18 additional government vehicles, each driven an average of 19.5 miles per day, 240 days per year. Vehicle emission rates reflect a vehicle fleet weighted toward light, medium, and heavy duty trucks. Emission reductions not included in the SIP forecasts are emission reductions that have occurred at NAWS Point Mugu between 1990 and 1996. Emission reductions have been quantified for aircraft operations, base-related personal vehicle travel, government vehicle travel, and natural gas use at on-base housing.

Data Sources:

- ATAC Corporation. 1997. NAS Lemoore F/A-18E/F Introduction and E-2 Realignment Airfield and Airspace Operational Study. Draft Report.
- Humm, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.
- George, Steve. 1998. 3-2-98 Fax, Vehicle Mileage Data for NAWS Point Mugu. Sent by Steve George, NAWS Point Mugu Environmental Division (Anteon Corporation) to Robert Sculley (Tetra Tech).
- U.S. Environmental Protection Agency. 1985. Compilation of Air Pollutant Emission Factors. 4th Edition. Volumes I and II. (AP-42).
- U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emissions Study - Report. (21A-2001).
- U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources. (EPA-450/4-81-126d (revised)).
- U.S. Environmental Protection Agency. 1993. Compilation of Air Pollutant Emission Factors. 4th Edition. Volume I, Supplement F. (AP-42).
- U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).
- U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines. (AESO Report No. 6-90).
- U.S. Navy. 1997. Baseline Emission Reduction Study. NAWS Point Mugu Environmental Division.
- U.S. Navy. 1997. Revised Emissions From All Sources For NAWS Point Mugu For 1990 And 1996. NAWS Point Mugu Environmental Division.
- Ventura County Air Pollution Control District. 1994. Ventura County 1994 Air Quality Management Plan. Appendix L: 1990 Baseline Emission Inventory Documentation.

TABLE 2. GROWTH FACTORS INCORPORATED INTO THE VENTURA COUNTY OZONE SIP EMISSION FORECASTS

GROWTH INDEX	EXAMPLE EMISSION SOURCE CATEGORIES	PROJECTED INCREASE OVER 1990 CONDITIONS				
		1996	1999	2000	2002	2005
No Growth	Residential Gas Combustion; Weed Abatement; Range Management Burns; Government Aircraft	0.0%	0.0%	0.0%	0.0%	0.0%
Military Aircraft	Commercial and Civil Aircraft; Jet Fuel Storage and Transfers	0.0%	0.0%	0.0%	0.0%	0.0%
Population	Unpaved Road Dust (non-farm); Permit-exempt Dry Cleaning; Auto Body Coating; Recreational Boating; Printing	7.3%	13.9%	16.1%	19.0%	23.3%
Total Dwelling Units	Architectural Coatings; Small Engine Utility Equipment; Water Heaters; Residential Wood Combustion; Asphalt Paving; Non-Agricultural Pesticide Use; Paved Road Entrained Dust	9.0%	16.6%	19.2%	22.8%	28.2%
Nonretail Employment	Industrial Process Fuel Combustion; Industrial Boilers; Permitted Dry Cleaning; Degreasing; Other Surface Coating; Industrial Solvent Use; Industrial Processes (Chemical, Mineral, Metal, Wood Products); Mobile Industrial Equipment	8.6%	18.0%	21.1%	26.1%	33.6%
Retail Employment	Commercial/Institutional Boilers; Commercial/Industrial Space Heaters; Stationary Engines; Commercial Building Construction and Demolition	3.6%	17.1%	22.0%	27.5%	34.0%
Vehicle Miles Traveled	On-Road Motor Vehicles	13.7%	20.5%	22.8%	27.3%	34.2%

Note: Growth indexes do not account for existing or anticipated emission control programs.

Data Source: Ventura County Air Pollution Control District. 1994. Ventura County 1994 Air Quality Management Plan. Table 9-1 and Table 9-3.  
Ventura County Air Pollution Control District. 1994. Ventura County 1994 Air Quality Management Plan. Appendix E-94: Emission Forecasts Documentation. Table E-4.

TABLE 3. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWA POINT MUGU

YEAR	EMISSION SOURCE CATEGORY	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
1990	Aircraft Operations	61.40	103.40	188.70	25.20	50.70
	Personal Vehicle Work Trips	39.75	28.38	396.00	0.73	75.97
	Government Vehicle Use	5.47	6.14	26.43	0.08	8.71
	Natural Gas Use, Housing	0.14	1.82	0.78	0.01	0.00
	.....	.....	.....	.....	.....	.....
	CAA Conformity Subtotal	106.76	139.74	611.91	26.02	135.37
	Engine Test Cells and Stands	1.24	8.80	5.90	nd	3.54
	Coating and Cleaning	10.39	0.00	0.00	0.00	0.00
	Diesel Engines	3.22	45.54	3.25	9.91	3.03
	Gasoline Engines	4.09	2.86	111.72	0.15	0.18
	Incinerator	0.01	0.08	0.01	nd	0.06
	Fuel Farm, JP-4 Jet Fuel	2.59	0.00	0.00	0.00	0.00
	Fuel Farm, Aviation Gasoline	2.71	0.00	0.00	0.00	0.00
	Fuel Farm, Vehicle Gasoline	1.95	0.00	0.00	0.00	0.00
	Fuel Oil Boilers	0.01	0.54	0.14	1.17	0.05
	Natural Gas Low NOx Boilers	0.00	0.00	0.00	0.00	0.00
	Propane Combustion	0.00	0.05	0.00	0.00	0.00
	Other Natural Gas Use	0.31	5.75	1.15	0.03	0.17
	Navy Exchange Gas Station	0.97	0.00	0.00	0.00	0.00
	Public Works Gas Station	0.26	0.00	0.00	0.00	0.00
	.....	.....	.....	.....	.....	.....
	Stationary Source Subtotal	27.75	63.62	122.17	11.26	7.03
	Lawn Mowers	11.80	1.69	nd	nd	nd
	.....	.....	.....	.....	.....	.....
	Other Emission Sources	11.80	1.69	0.00	0.00	0.00
	Total Base-Related Emissions	146.31	205.05	734.08	37.28	142.40
1990 Totals	CAA Conformity Subtotal	106.76	139.74	611.91	26.02	135.37
	Stationary Source Subtotal	27.75	63.62	122.17	11.26	7.03
	Other Emission Sources	11.80	1.69	0.00	0.00	0.00
	.....	.....	.....	.....	.....	.....
	Total Base-Related Emissions	146.31	205.05	734.08	37.28	142.40

TABLE 3. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWA POINT MUGU

YEAR	EMISSION SOURCE CATEGORY	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
1996	Aircraft Operations	33.12	67.19	97.04	5.11	23.83
	Personal Vehicle Work Trips	36.53	26.08	363.92	0.67	69.81
	Government Vehicle Use	4.86	5.45	23.46	0.07	7.73
	Fuel Farm, JP-8 Jet Fuel	0.00	0.00	0.00	0.00	0.00
	Natural Gas Use, Housing	0.12	1.54	0.65	0.01	0.00
	-----	-----	-----	-----	-----	-----
	CAA Conformity Subtotal	74.63	100.26	485.07	5.86	101.37
	Engine Test Cells	0.13	2.40	1.14	0.46	1.15
	Coating and Cleaning	3.66	0.00	0.00	0.00	0.00
	Diesel Engines	1.64	23.26	1.66	5.06	1.55
	Gasoline Engines	3.45	2.41	94.16	0.13	0.15
	Incinerator	0.00	0.00	0.00	0.00	0.00
	Fuel Farm, Aviation Gasoline	2.71	0.00	0.00	0.00	0.00
	Fuel Farm, Vehicle Gasoline	1.95	0.00	0.00	0.00	0.00
	Fuel Oil Boilers	0.00	0.06	0.01	0.13	0.01
	Natural Gas Low NOx Boilers	0.09	0.71	0.35	0.01	0.05
	Propane Combustion	0.00	0.00	0.00	0.00	0.00
	Other Natural Gas Use	0.17	3.22	0.64	0.02	0.10
	Navy Exchange Gas Station	0.89	0.00	0.00	0.00	0.00
	Public Works Gas Station	0.21	0.00	0.00	0.00	0.00
	-----	-----	-----	-----	-----	-----
	Stationary Source Subtotal	14.90	32.06	97.96	5.81	3.01
	Lawn Mowers	11.80	1.69	nd	nd	nd
	-----	-----	-----	-----	-----	-----
	Other Emission Sources	11.80	1.69	0.00	0.00	0.00
	-----	-----	-----	-----	-----	-----
	Total Base-Related Emissions	101.33	134.01	583.03	11.67	104.38
1996 Totals	CAA Conformity Subtotal	74.63	100.26	485.07	5.86	101.37
	Stationary Source Subtotal	14.90	32.06	97.96	5.81	3.01
	Other Emission Sources	11.80	1.69	0.00	0.00	0.00
	-----	-----	-----	-----	-----	-----
	Total Base-Related Emissions	101.33	134.01	583.03	11.67	104.38

TABLE 3. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWA POINT MUGU

YEAR	EMISSION SOURCE CATEGORY	1990-1996 EMISSIONS CHANGE, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
1990-1996 Change	Aircraft Operations	-28.28	-36.21	-91.66	-20.09	-26.87
	Personal Vehicle Work Trips	-3.22	-2.30	-32.08	-0.06	-6.15
	Government Vehicle Use	-0.61	-0.69	-2.97	-0.01	-0.98
	Natural Gas Use, Housing	-0.02	-0.28	-0.13	0.00	0.00
	CAA Conformity Subtotal	-32.13	-39.48	-126.84	-20.16	-34.00
	Engine Test Cells and Stands	-1.11	-6.40	-4.76	0.46	-2.39
	Coating and Cleaning	-6.73	0.00	0.00	0.00	0.00
	Diesel Engines	-1.58	-22.28	-1.59	-4.85	-1.48
	Gasoline Engines	-0.64	-0.45	-17.56	-0.02	-0.03
	Incinerator	-0.01	-0.08	-0.01	0.00	-0.06
	Fuel Farm, JP-4 Jet Fuel	-2.59	0.00	0.00	0.00	0.00
	Fuel Farm, Aviation Gasoline	0.00	0.00	0.00	0.00	0.00
	Fuel Farm, Vehicle Gasoline	0.00	0.00	0.00	0.00	0.00
	Fuel Oil Boilers	-0.01	-0.48	-0.13	-1.04	-0.04
	Natural Gas Low NOx Boilers	0.09	0.71	0.35	0.01	0.05
	Propane Combustion	0.00	-0.05	0.00	0.00	0.00
	Other Natural Gas Use	-0.14	-2.53	-0.51	-0.01	-0.07
	Navy Exchange Gas Station	-0.08	0.00	0.00	0.00	0.00
	Public Works Gas Station	-0.05	0.00	0.00	0.00	0.00
	Stationary Source Subtotal	-12.85	-31.56	-24.21	-5.45	-4.02
	Lawn Mowers	0.00	0.00	0.00	0.00	0.00
	Other Emission Sources	0.00	0.00	0.00	0.00	0.00
	Total Base-Related Emissions	-44.98	-71.04	-151.05	-25.61	-38.02
1990-1996 Change	CAA Conformity Subtotal	-32.13	-39.48	-126.84	-20.16	-34.00
	Stationary Source Subtotal	-12.85	-31.56	-24.21	-5.45	-4.02
	Other Emission Sources	0.00	0.00	0.00	0.00	0.00
	Total Base-Related Emissions	-44.98	-71.04	-151.05	-25.61	-38.02

TABLE 3. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWS POINT MUGU

Notes: Emissions from aircraft operations in 1990 taken from the Ventura County 1994 ozone SIP document (Ventura County Air Pollution Control District 1994). Emissions from aircraft operations in 1996 taken from NAWS Point Mugu Environmental Division staff analyses.

Personal vehicle work trip emissions for 1990 and 1996 extrapolated from 1999 personal vehicle work trip emissions for E-2 personnel (1996 personnel) using a 1990 workforce of 8,887 personnel and a 1996 workforce of 8,167 personnel.

Government vehicle use emissions based on 1990 and 1996 vehicle fleet vmt (Table 7) and 1999 emission factors for a vehicle mix dominated by light, medium, and heavy duty trucks. See Table 8.

To avoid the confounding effects of vehicle model year turnover in personal and government vehicle fleets, 1999 calendar year vehicle emission rates have been applied to both 1990 and 1996 baseline vehicle travel data.

NAWS Point Mugu Environmental Division staff analyses (U.S. Navy 1997) used for all other emission source categories.

To ensure fair comparisons with Table 1, CAA conformity subtotals include only those emission source categories that have been evaluated in connection with the E-2 realignment and which do not include stationary sources with air pollution control district permits.

Because in-frame engine run-ups for 1990 and 1996 are not sufficiently documented, the net reduction in engine run-up emissions has not been estimated.

Sources: Ventura County Air Pollution Control District. 1994. 1994 Ventura County Air Quality Management Plan, Appendix L-94: 1990 Baseline Emission Inventory Documentation.

U.S. Navy. 1997. Revised Emissions From All Sources For NAWS Point Mugu for 1990 and 1996. NAWS Point Mugu Environmental Division.

TABLE 4. NAWS POINT MUGU AIRCRAFT EMISSIONS INCLUDED IN THE VENTURA COUNTY OZONE SIP

AIRCRAFT TYPE	FLIGHT ACTIVITY	ANNUAL NUMBER	ANNUAL EMISSIONS (TONS PER YEAR)				
			ROG	NO <sub>x</sub>	CO	SO <sub>x</sub>	PM <sub>10</sub>
P-3; C-130	LTO cycles	3,468	3.3	32.4	13.9	8.2	10.1
	T&G cycles	5,157	0.4	12.1	1.3	4.8	5.4
C-12	LTO cycles	373	1.0	0.2	1.3	0.1	0.0
	T&G cycles	917	0.02	0.01	0.1	0.02	0.0
A-7	LTO cycles	1,040	6.4	3.2	11.9	0.6	0.0
	T&G cycles	1,356	0.1	3.6	0.4	0.4	0.0
F-86	LTO cycles	286	3.3	0.4	2.8	0.2	1.0
	T&G cycles	230	0.02	0.3	0.1	0.1	0.3
A-3	LTO cycles	645	15.0	1.9	12.8	0.7	4.3
	T&G cycles	277	0.1	0.6	0.2	0.1	0.7
A-6	LTO cycles	63	0.3	0.1	0.9	0.04	0.4
	T&G cycles	343	0.03	0.4	0.3	0.1	0.8
F-4	LTO cycles	463	5.1	1.3	16.2	0.6	2.4
	T&G cycles	716	0.3	1.6	3.4	0.6	0.7
F-14	LTO cycles	1,114	7.3	5.1	16.7	1.5	3.3
	T&G cycles	1,318	0.3	4.8	5.1	1.3	1.1
F/A-18	LTO cycles	1,713	13.6	10.8	39.8	1.8	11.38
	T&G cycles	3,225	0.3	18.3	14.9	1.6	8.0
T-38	LTO cycles	295	1.6	0.3	12.3	0.3	0.0
	T&G cycles	0	0.0	0.0	0.0	0.0	0.0
H-46	LTO cycles	276	1.2	0.2	2.2	0.1	0.2
	T&G cycles	1,272	0.2	0.8	2.4	0.3	0.6
UH-1	LTO cycles	849	0.3	0.5	1.0	0.2	0.0
	T&G cycles	9,764	0.0	4.2	1.0	1.4	0.0
206B	LTO cycles	883	0.3	0.2	0.9	0.1	0.03
	T&G cycles	0	0.0	0.0	0.0	0.0	0.0
CV-440	LTO cycles	1,620	0.9	0.1	26.8	0.0	0.0
	T&G cycles	0	0.0	0.0	0.0	0.0	0.0



TABLE 4. NAWA POINT MUGU AIRCRAFT EMISSIONS INCLUDED IN THE VENTURA COUNTY OZONE SIP

AIRCRAFT TYPE	FLIGHT ACTIVITY	ANNUAL NUMBER	ANNUAL EMISSIONS (TONS PER YEAR)				
			ROG	NOx	CO	SOx	PM10
TOTALS		37,663	61.4	103.4	188.7	25.2	50.7

Notes: LTO = landing and take-off  
 T&G = touch and go  
 ROG = reactive organic compound  
 NOx = nitrogen oxides  
 CO = carbon monoxide  
 SOx = sulfur oxides  
 PM10 = inhalable particulate matter

Data taken from Appendix L-94 of the 1994 Ventura County Air Quality Management Plan, pages L-222, L-223, L-224, L-228, and L-229; PM10 emissions extrapolated from TSP values using emissions summary ratio derived from data on page L-219.

TABLE 5. AIRCRAFT REMOVED FROM NAWS POINT MUGU BETWEEN 1990 AND 1996

AIRCRAFT TYPE	NUMBER REMOVED	SQUADRON OR ACTIVITY	1990 LTO CYCLES	1990 T&G CYCLES
C-130	1	Air National Guard	51	178
C-12	2	PMTc flight test	373	917
A-7	14	VAQ-34; PMTC fight test	1,040	1,356
F-86	8	Target operations	286	230
A-3	7	VAQ-34	645	277
A-6	3	PMTc flight test	63	343
F-4	1	VX-4	42	65
F-14	2	VX-4	111	132
F/A-18	19	VX-4; VFA-305; PMTC flight test	1,714	3,225
H-46	3	SAR helicopters	276	1,272
UH-1	5	VXE-6	849	9,764
CV-440	2	Renown Aviation	720	0
TOTALS	67		6,169	17,759

Notes: LTO = landing and take-off  
T&G = touch and go

Data Source: U.S. Navy. 1997. Revised Emissions From All Sources for NAWS Point Mugu for 1990 and 1996. NAWS Point Mugu Environmental Division.

TABLE 6. ESTIMATED 1996 AIRCRAFT EMISSIONS FOR NAWA POINT MUGU

AIRCRAFT TYPE	ANNUAL LTO CYCLES	ANNUAL T&G CYCLES	ANNUAL EMISSIONS (TONS PER YEAR)				
			ROG	NOx	CO	SOx	PM10
P-3	1,166	1,424	2.23	17.06	4.95	1.19	4.97
C-130	2,036	1,866	3.60	27.11	8.50	1.91	8.03
C-12	0	0	0.00	0.00	0.00	0.00	0.00
A-7	0	0	0.00	0.00	0.00	0.00	0.00
F-86	0	0	0.00	0.00	0.00	0.00	0.00
A-3	0	0	0.00	0.00	0.00	0.00	0.00
A-6	0	0	0.00	0.00	0.00	0.00	0.00
F-4	596	452	6.73	2.15	21.47	0.29	3.65
F-14	2,142	434	14.09	10.68	32.25	0.93	3.46
F/A-18	420	366	3.38	4.08	9.83	0.19	1.21
T-38	373	266	1.33	0.18	9.47	0.16	0.83
H-46	0	0	0.00	0.00	0.00	0.00	0.00
UH-1	0	0	0.00	0.00	0.00	0.00	0.00
206B	884	0	0.15	0.12	0.46	0.05	0.02
CV-440	0	0	0.00	0.00	0.00	0.00	0.00
H-60	600	1,250	0.20	0.87	0.82	0.09	0.38
CV-340	90	0	0.75	0.03	5.24	0.02	0.01
CV-580	635	0	0.42	2.97	1.26	0.22	0.95
METROLINER	1,143	0	0.10	0.78	0.35	0.06	0.25
GENERAL AVIATION	754	0	0.05	0.01	1.83	0.00	0.00
OTHER CARRIERS	21	0	0.09	1.15	0.61	0.00	0.07

TABLE 6. ESTIMATED 1996 AIRCRAFT EMISSIONS FOR NAWS POINT MUGU

AIRCRAFT TYPE	ANNUAL LTO CYCLES	ANNUAL T&G CYCLES	ANNUAL EMISSIONS (TONS PER YEAR)				
			ROG	NOx	CO	SOx	PM10
TOTALS	10.860	6.058	33.12	67.19	97.04	5.11	23.83

Notes: LTO = landing and take-off  
T&G = touch and go  
ROG = reactive organic compound  
NOx = nitrogen oxides  
CO = carbon monoxide  
PM10 = inhalable particulate matter

Data Source: U.S. Navy. 1997. Revised Emissions From All Sources for NAWS Point Mugu for 1990 and 1996. NAWS Point Mugu Environmental Division.

TABLE 7. NAWS POINT MUGU GOVERNMENT VEHICLE USE, 1990 - 1997

YEAR	NUMBER OF GOVERNMENT VEHICLES	PER VEHICLE AVERAGES		ANNUAL CUMUALTIVE VMT
		VMT/YEAR	VMT/DAY	
1990	no data	no data	no data	2,406,191
1992	481	5,033	20.97	2,420,873
1993	480	5,450	22.71	2,616,000
1994	494	4,802	20.01	2,372,188
1995	506	4,818	20.08	2,437,908
1996	505	4,230	17.63	2,136,150
1997	509	3,750	15.63	1,908,750
MEAN (1992-97)	496	4,681	19.50	2,315,312

Source: Data provided by NAWS Point Mugu staff.

TABLE 8. ESTIMATED CHANGE IN NAWS PT MUGU GOVERNMENT VEHICLE EMISSIONS, 1990 TO 1996 BASELINES

CONDITION	GOV VEHICLE TRAVEL COMPONENT	ANNUAL VMT	ESTIMATED EMISSIONS, TONS PER YEAR				
			ROG	NOx	CO	SOx	PM10
1990 BASELINE	ON-BASE	1,716,129	4.56	4.27	20.19	0.06	6.21
	OFF-BASE	690,062	0.91	1.87	6.24	0.02	2.50
	.....	.....	.....	.....	.....	.....	.....
	TOTAL	2,406,191	5.47	6.14	26.43	0.08	8.71
1996 BASELINE	ON-BASE	1,523,532	4.04	3.79	17.92	0.05	5.51
	OFF-BASE	612,618	0.81	1.66	5.54	0.02	2.22
	.....	.....	.....	.....	.....	.....	.....
	TOTAL	2,136,150	4.86	5.45	23.46	0.07	7.73
1990-1996 CHANGE	ON-BASE	(192,597)	-0.51	-0.48	-2.27	-0.01	-0.70
	OFF-BASE	(77,444)	-0.10	-0.21	-0.70	-0.00	-0.28
	.....	.....	.....	.....	.....	.....	.....
	TOTAL	(270,041)	-0.61	-0.69	-2.97	-0.01	-0.98

NOTES: OFF-BASE = trips coming onto or leaving the base  
 ON-BASE = trips remaining within base boundaries  
 VMT = vehicle miles traveled  
 ROG = reactive organic gases (exhaust + evaporatives, summer rates)  
 NOx = oxides of nitrogen (summer rates)  
 CO = carbon monoxide (average of summer and winter rates)  
 SOx = sulfur oxides  
 PM10 = inhalable particulate matter (exhaust, tire wear, road dust)

Total VMT estimates for government vehicles from NAWS Point Mugu staff (see Table 7).

To avoid the confounding effects of vehicle model year turnover in the government vehicle fleet, 1999 calendar year vehicle emission rates have been applied to both the 1990 and 1996 baseline vmt values.